

## REMARKS

Claims 28-53 are pending in this application. By this Amendment, claim 50 has been amended to incorporate the feature of claim 51. Claim 46 has been amended to incorporate the features of claim 47. Claims 47 and 51 have been canceled. Claim 54 is new, support for which can be found in claims 28 and 50. Entry and consideration of this Amendment is earnestly requested in that it does not introduce new matter.

### *Claim Rejections*

#### Rejections under §35 U.S.C. 103

##### A. Response to rejection of claims 28-39, and 48-53 under 35 U.S.C. §103(a) as being unpatentable over Masaki et al.

In response to the Rejection of claims 28-39, and 48-53 under 35 U.S.C. §103(a) as being unpatentable over European Application No. EP640624 of Masaki et al. ("Masaki"), Applicants submit that a *prima facie* case of Obviousness has not been made out and traverse the Rejection.

With respect to a rejection under 103(a), the U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under §103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of non-obviousness. Accordingly, for the Examiner to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. See MPEP §2143. Finally, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. (BNA) 580 (C.C.P.A. 1974).

First, the Examiner has acknowledged that Masaki do not explicitly specify the relative contents of the butene-1 and ethylene monomers. The Examiner also acknowledges that Masaki do not specify the copolymer being random, having  $r_1 \cdot r_2$  reactivity ratios being 1.5 or less, specific isotacticity values of butene-1 units in the copolymer, or the polydispersity index. In addition, however, Masaki merely disclose that a variety of polyolefins could be produced.

As the olefin to be polymerized there may be used an olefin having up to 12 carbon atoms. Typical examples of olefin include ethylene, propylene, butene-1, 4-methylpentene-1, hexene-1, and octene-1. The present invention is advantageous for stereospecific polymerization of an  $\alpha$ -olefin having 3 or more carbon atoms, such as a mixture of these olefins and a mixture thereof with ethylene. The present invention is particularly advantageous for stereospecific polymerization of propylene or a mixture of propylene and up to 20 mol% of ethylene or a higher  $\alpha$ -olefin (i.e., having 4 or more carbon atoms), and most advantageous for homopolymerization of propylene. According to the process of the present invention, a propylene polymer having a melting point of 164 ° C or higher and a xylene-soluble content (% XSRT as defined below) at room temperature of 2.0 % or less can be obtained. (Page 7, lines 18-26, Emphasis added)

Accordingly, Applicants respectfully believe that Masaki only generally disclose that a variety of olefins could possibly be polymerized, but disclose more specifically polymerizing polypropylene homo- and copolymers. In fact, this is evidenced by every working example in Masaki being directed towards polymerizing propylene. Additionally, Applicants respectfully believe that nowhere in Masaki is there any disclosure of specifically copolymerizing butene-1 with ethylene, propylene, or mixtures thereof to produce the currently claimed butene-1 copolymers, comprising the currently claimed comonomers in the currently claimed molar percentages.

The Examiner maintains that it would have been obvious to produce polymers where butene-1 monomer is the major monomer, however there is no specific direction to be found for this position in Masaki. As discussed above, Masaki's preferred composition caps ethylene or higher  $\alpha$ -olefin levels at 20 mol%. In contrast, the Examiner's position appears to be that the reference discloses every possible copolymer having 3 or more carbons with ethylene in any comonomer amount whatsoever, suitable for the purposes of §103. Further, there is no basis for the Examiner's assertion that the claimed properties, such as product reactivity ratios, content of butene-1 units in the form of isotactic pentads, and absence of 4,1 insertions of butene units will

intrinsically be present in the butene-copolymer. Masaki do not specifically disclose the claimed butene copolymers. In particular, with respect to dependent claim 34, Masaki do not teach, suggest or disclose the claimed butene/propylene copolymer.

Therefore, Applicants respectfully submit that a *prima facie* case of Obviousness has not been made out, since modification of the reference as suggested by the Examiner “does not present a finite (and small in the context of the art) number of options easily traversed to show obviousness.” *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008). Reconsideration and withdrawal of the Rejection respectfully is requested.

B. Response to rejection of claims 28-39, and 48-53 under 35 U.S.C. §103(a) as being unpatentable over Masaki in view of Fukui et al. and Cozewith et al.

In response to the Rejection of claims 28-39 and 48-53 under 35 U.S.C. §103(a) as being unpatentable over Masaki in view of U.S. Patent No. 4,600,762 of Fukui et al. (“Fukui”) and U.S. Patent Publication No. 2002/0004575 of Cozewith et al. (“Cozewith”), Applicants submit that a *prima facie* case of Obviousness has not been made out and traverse the Rejection.

The threshold requirements of a Rejection under §103 have been described in paragraph A above.

As discussed in paragraph A, Masaki do not teach, suggest or disclose, either directly or inherently, Applicants’ currently claimed butene-1 copolymers, the arguments of which are incorporated in this Rejection. Cozewith and Fukui fail to remedy the numerous deficiencies of Masaki. In particular, Cozewith provides only a generic definition of “random” in terms of reactivity ratio. With respect to Fukui, it fails to disclose, teach, or suggest Applicants’ currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units. Additionally, Applicants respectfully believe there is no disclosure or teaching within any of the documents as to how to modify the documents to arrive at Applicants’ currently claimed butene-1 copolymers; nor would one having ordinary skill in the art been motivated to try and modify Masaki, Fukui, or Cozewith to arrive at Applicant’s currently

claimed butene-1 copolymers. However, this is the Examiner's initial burden to establish a *prima facie* case of obviousness. See MPEP §2142. Fukui do not specifically disclose a hexyltrimethoxysilane as an external donor, and in the examples only vinyltriethoxysilane (VTES) is found. In this regard, the catalyst disclosed in Fukui is not the same as that of the present invention. Fukui also do not specify the randomization ( $r_1r_2$ ) and the value of  $1,4$  insertion of the copolymers disclosed. Further, as demonstrated in the previously submitted Declaration of Fabrizio Piemontesi, comparative example 3c demonstrates that VTES is not capable of producing the same level of isotacticity as the external donor of the instant invention.

The Examiner is incorrect in alleging that Masaki's polymer would be a copolymer intrinsically having the claimed product reactivity range. As discussed above, Masaki preferably teach propylene homopolymers or copolymers of propylene with contents of comonomer of 20 mol%. The combination of references do not explicitly or intrinsically teach a polymer composition with butene-1 as the major component having a product of the reactivity ratios  $r_1 \cdot r_2 \leq 1.5$ ; a content of butene-1 units in form of isotactic pentads (mmmm) > 98.5%; and an absence of  $4,1$  insertions of butene units.

Therefore, Applicants respectfully submit that a *prima facie* case of Obviousness has not been made out, since modification of the references as suggested by the Examiner "does not present a finite (and small in the context of the art) number of options easily traversed to show obviousness." *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008). Reconsideration and withdrawal of the Rejection respectfully is requested.

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C. Response to rejection of claims 40-45 under 35 U.S.C. §103(a) as being unpatentable over Hwo in view of Masaki, Fukui, and Cozewith.

In response to the Rejection of claims 40-45 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,960,820 of Hwo ("Hwo") in view of Masaki, Fukui and Cozewith, Applicants submit that a *prima facie* case of Obviousness has not been made out and traverse the Rejection.

The threshold requirements of a Rejection under §103 have been described in paragraph A above.

With respect to Hwo, it fails to disclose, teach, or suggest Applicants' currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units.

Masaki, Fukui and Cozewith fail to remedy the deficiencies of Hwo. With respect to Masaki, it generally discloses on page 7, lines 18-26:

As the olefin to be polymerized there may be used an olefin having up to 12 carbon atoms. Typical examples of olefin include ethylene, propylene, butene-1, 4-methylpentene-1, hexene-1, and octene-1. The present invention is advantageous for stereospecific polymerization of an  $\alpha$ -olefin having 3 or more carbon atoms, such as a mixture of these olefins and a mixture thereof with ethylene. The present invention is particularly advantageous for stereospecific polymerization of propylene or a mixture of propylene and up to 20 mol% of ethylene or a higher  $\alpha$ -olefin (i.e., having 4 or more carbon atoms), and most advantageous for homopolymerization of propylene. According to the process of the present invention, a propylene polymer having a melting point of 164 ° C or higher and a xylene-soluble content (% XSRT as defined below) at room temperature of 2.0 % or less can be obtained. (Emphasis added)

Accordingly, Applicants respectfully believe that Masaki only generally disclose that a variety of olefins could possibly be polymerized using the catalyst system disclosed therein, but disclose more specifically polymerizing polypropylene homo- and copolymers. In fact, this is evidenced by every working example in Masaki being directed towards polymerizing propylene.

Additionally, Applicants respectfully believe that nowhere in Masaki is there any disclosure of specifically copolymerizing butene-1 with ethylene, propylene, or mixtures thereof to produce the currently claimed butene-1 copolymers, comprising the currently claimed comonomers in the currently claimed molar percentages.

With respect to Cozewith, it provides only a generic definition of “random” in terms of reactivity ratio. With respect to Fukui, it fails to disclose, teach, or suggest Applicants’ currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units. Additionally, Applicants respectfully believe there is no disclosure or teaching within any of the documents as to how to modify the documents to arrive at Applicants’ currently claimed butene-1 copolymers; nor would one having ordinary skill in the art been motivated to try and modify Masaki, Fukui, or Cozewith to arrive at Applicant’s currently claimed butene-1 copolymers. However, this is the Examiner’s initial burden to establish a *prima facie* case of obviousness. See MPEP §2142. Fukui do not specifically disclose a hexyltrimethoxysilane as an external donor, and in the examples only vinyltriethoxysilane (VTES) is found. In this regard, the catalyst disclosed in Fukui is not the same as that of the present invention. Fukui also do not specify the randomization ( $r_1 r_2$ ) and the value of 1,4 insertion of the copolymers disclosed. Further, as demonstrated in the previously submitted Declaration of Fabrizio Piemontesi, comparative example 3c demonstrates that VTES is not capable of producing the same level of isotacticity as the external donor of the instant invention.

Therefore, Applicants respectfully submit that a *prima facie* case of Obviousness has not been made out, since modification of the reference as suggested by the Examiner “does not present a finite (and small in the context of the art) number of options easily traversed to show obviousness.” *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008). Reconsideration and withdrawal of the Rejection respectfully is requested.

D. Response to rejection of claims 40-45 under 35 U.S.C. §103(a) as being unpatentable over Collina et al. in view of Masaki, Fukui, and Cozewith.

In response to the Rejection of claims 40-45 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,180,720 of Collina et al. ("Collina") in view of Masaki, Fukui and Cozewith, Applicants submit that a *prima facie* case of Obviousness has not been made out and traverse the Rejection.

The threshold requirements of a Rejection under §103 have been described in paragraph A above.

With respect to Collina, it fails to disclose, teach, or suggest Applicants' currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units.

Masaki, Fukui and Cozewith fail to remedy the deficiencies of Collina. With respect to Masaki, it generally discloses on page 7, lines 18-26:,

As the olefin to be polymerized there may be used an olefin having up to 12 carbon atoms. Typical examples of olefin include ethylene, propylene, butene-1, 4-methylpentene-1, hexene-1, and octene-1. The present invention is advantageous for stereospecific polymerization of an  $\alpha$ -olefin having 3 or more carbon atoms, such as a mixture of these olefins and a mixture thereof with ethylene. The present invention is particularly advantageous for stereospecific polymerization of propylene or a mixture of propylene and up to 20 mol% of ethylene or a higher  $\alpha$ -olefin (i.e., having 4 or more carbon atoms), and most advantageous for homopolymerization of propylene. According to the process of the present invention, a propylene polymer having a melting point of 164 ° C or higher and a xylene-soluble content (% XSRT as defined below) at room temperature of 2.0 % or less can be obtained. (Emphasis added)

Accordingly, Applicants respectfully believe that Masaki only generally disclose that a variety of olefins could possibly be polymerized, but disclose more specifically polymerizing polypropylene homo- and copolymers. In fact, this is evidenced by every working example in Masaki being directed towards polymerizing propylene. Additionally, Applicants respectfully believe that nowhere in Masaki is there any disclosure of specifically copolymerizing butene-1 with ethylene, propylene, or mixtures thereof to produce the currently claimed butene-1 copolymers, comprising the currently claimed comonomers in the currently claimed molar percentages.

With respect to Cozewith, it provides only a generic definition of “random” in terms of reactivity ratio. With respect to Fukui, it fails to disclose, teach, or suggest Applicants’ currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units. Additionally, Applicants respectfully believe there is no disclosure or teaching within any of the documents as to how to modify the documents to arrive at Applicants’ currently claimed butene-1 copolymers; nor would one having ordinary skill in the art been motivated to try and modify Masaki, Fukui, or Cozewith to arrive at Applicant’s currently claimed butene-1 copolymers. However, this is the Examiner’s initial burden to establish a *prima facie* case of obviousness. See MPEP §2142. Fukui do not specifically disclose a hexyltrimethoxysilane as an external donor, and in the examples only vinyltriethoxysilane (VTES) is found. In this regard, the catalyst disclosed in Fukui is not the same as that of the present invention. Fukui also do not specify the randomization ( $r_1 r_2$ ) and the value of 1,4 insertion of the copolymers disclosed. Further, as demonstrated in the previously submitted Declaration of Fabrizio Piemontesi, comparative example 3c demonstrates that VTES is not capable of producing the same level of isotacticity as the external donor of the instant invention.

Therefore, Applicants respectfully submit that a *prima facie* case of Obviousness has not been made out, since modification of the reference as suggested by the Examiner “does not present a finite (and small in the context of the art) number of options easily traversed to show obviousness.” *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358,



1364 (Fed. Cir. 2008). Reconsideration and withdrawal of the Rejection respectfully is requested.

E. Response to rejection of claims 46-47 under 35 U.S.C. §103(a) as being unpatentable over Mulas et al. in view of Masaki, Fukui, and Cozewith.

In response to the Rejection of claims 46-47 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,465,574 of Mulas et al. ("Mulas") in view of Masaki, Fukui and Cozewith, Applicants submit that a *prima facie* case of Obviousness has not been made out and traverse the Rejection.

The threshold requirements of a Rejection under §103 have been described in paragraph A above.

With respect to Mulas, it fails to disclose, teach, or suggest Applicants' currently and specifically claimed butene-1 copolymer comprising up to 40% by mol of at least one comonomer, the comonomer being selected from ethylene, propylene, and mixtures thereof, with the butene-1 copolymers further comprising: (a) a product of the reactivity ratios  $r_1 \cdot r_2 \leq 2$ ; (b) a content of butene-1 units in form of isotactic pentads (mmmm) > 98%; and (c) an absence of 4,1 insertions of butene units.

Masaki, Fukui and Cozewith fail to remedy the deficiencies of Mulas. With respect to Masaki, it generally discloses on page 7, lines 18-26:

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higher and a xylene-soluble content (% XSRT as defined below) at room temperature of 2.0 % or less can be obtained. (Emphasis added)

Accordingly, Applicants respectfully believe that not only do Masaki only generally disclose that a variety of olefins could possibly be polymerized but Masaki disclose more specifically polymerizing polypropylene homo- and copolymers. In fact, this is evidenced by every working example in Masaki being directed towards polymerizing propylene. Additionally, Applicants respectfully believe that nowhere in Masaki is there any disclosure of specifically copolymerizing butene-1 with ethylene, propylene, or mixtures thereof, produce the currently claimed butene-1 copolymers, comprising the currently claimed comonomers in the currently claimed molar percentages.

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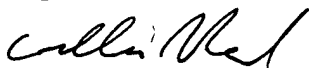
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Applicants respectfully request that a timely Notice of Allowance be issued in this case. Should the Examiner have questions or comments regarding this application or this Amendment, Applicant’s attorney would welcome the opportunity to discuss the case with the Examiner.

The Commissioner is hereby authorized to charge U.S. PTO Deposit Account 08-2336 in the amount of any fee required for consideration of this Amendment.

Respectfully submitted,

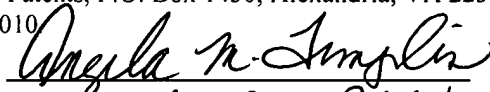


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I hereby certify that this correspondence is being deposited with sufficient postage thereon with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on July 27, 2010.

  
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Date of Signature

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